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Patent Department, M/S 2061
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EXAMINER

BRUENJES, CHRISTOPHER P

ART UNIT

PAPER NUMBER

1772

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/807,750

Applicant(s)

LIN ET AL.

Examiner

Christopher P Bruenjes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-19 is/are pending in the application.
- 4a) Of the above claim(s) 12-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11, 18 and 19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-11 in the reply filed on November 24, 2004 is acknowledged.

2. Claims 12-17 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on November 24, 2004.

WITHDRAWN REJECTIONS

3. The objection to the specification of record in the Office Action mailed August 25, 2004, Page 5 Paragraph 6, has been withdrawn due to Applicant's amendments in the Paper filed November 24, 2004.

4. The 35 U.S.C. 102 rejections of claims 9 and 11 as anticipated by Chang et al of record in the Office Action mailed August 25, 2004, Page 6 Paragraph 7, have been withdrawn due to Applicant's amendments in the Paper filed November 24, 2004.

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5. The 35 U.S.C. 103 rejections of claims 9 and 11 over Shih in view of Akiyama of record in the Office Action mailed August 25, 2004, Pages 10-11 Paragraph 10, have been withdrawn due to Applicant's amendments in the Paper filed November 24, 2004.

REPEATED REJECTIONS

6. The Double Patenting rejections of claims 1-9 and 11 over the claims 1-35 of USPN 6,777,045 are repeated for the reasons previously of record in the Office Action mailed August 25, 2004, Page 4 Paragraph 5.

7. The 35 U.S.C. 103 rejections of claims 1, 2, and 4-8 over Chang et al are repeated for the reasons previously of record in the Office Action mailed August 25, 2004, Pages 7-8 Paragraph 8.

8. The 35 U.S.C. 103 rejection of claim 3 over Chang et al in view of Levinstein et al is repeated for the reasons previously of record in the Office Action mailed August 25, 2004, Pages 9-10 Paragraph 9.

9. The 35 U.S.C. 103 rejections of claims 1, 2, and 4-8 over Shih in view of Akiyama are repeated for the reasons previously

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of record in the Office Action mailed August 25, 2004, Pages 10-11 Paragraph 10.

10. The 35 U.S.C. 103 rejection of claim 3 over Shih in view of Akiyama and further in view of Levinstein is repeated for the reasons previously of record in the Office Action mailed August 25, 2004, Pages 11-13 Paragraph 11.

NEW REJECTIONS

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 18-19 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-35 of U.S. Patent No. 6,777,045.

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Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of '045 teach a substrate processing chamber component such as a domed enclosure wall comprising a structure composed of aluminum oxide and having a roughened surface with a roughness average of from about 150 to about 450 microinches and a plasma sprayed ceramic coating deposited on the roughened surface of the structure composed of aluminum oxide, wherein the plasma sprayed ceramic coating comprises a textured exposed surface having a roughness with an average skewness across the textured exposed surface that is a negative value and less than about -0.1. The coating comprises a porosity from about 5% to about 10% and a thickness between 1 mil and 8 mils.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for

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establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al (US 2002/0086118 A1) in view of Levinstein et al (USPN 4,419,201).

Chang et al teach a substrate processing chamber component such as chamber walls (see abstract), which includes domed enclosure walls and at least a portion of a ceiling. The component comprises a structure composed of aluminum oxide or alumina (p.2 paragraph 21) having a roughened surface (p.3, paragraph 26). A plasma sprayed ceramic coating deposited on the surface of the structure composed of aluminum oxide or alumina (p.3, paragraph 29) have a roughness average of from about 150 to 190 microinches (p.2, paragraph 22). The thickness of the ceramic coating is between 2 mils and 5 mils (p.3, paragraph 29). The substrate processing chamber comprises a substrate support a process gas supply, a plasma generator to energize the process gas, and a gas exhaust (p.1, paragraph 4).

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Chang et al fail to explicitly teach that the roughened surface of the structure has a roughness average of from about 150 to about 450 microinches. However, Chang et al teach that surface of the structure is grit blasted in order to roughen the surface and that the roughened surface profile of the substrate resulting from the grit blasting can help promote mechanical keying or interlocking of the coating with the substrate (p.3, paragraph 26). Chang et al further teach that the final outside roughness of the coating is between 150 and 450 microinches. One of ordinary skill in the art would have recognized that the roughened surface of the structure would be roughened an amount to maximize the bonding of the coating to the structure, as taught by Chang et al, and that the roughness value must be close to range of 150 to 450 microinches because textured surface of the ceramic coating has a roughness value between 150 to 190 microinches, as taught by Chang et al.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the applicant's invention was made to select the roughness value of the roughened surface of the structure of Chang et al within the range of 150 to 450 microinches, in order to maximize the bonding of the coating to the structure while still allowing the textured surface of the

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ceramic coating to have a roughness value between 150 and 190 microinches, as taught by Chang et al.

Chang et al fails to explicitly teach that the plasma sprayed ceramic coating comprises a porosity of from about 5% to about 10%. However, Levinstein teaches that a plasma sprayed ceramic coating comprised of aluminum oxide (col. 4, lines 52-55), that is applied to a dielectric material comprising ceramics (col. 4, lines 42-45), used in a plasma processing chamber (col.4, lines 30-34) comprises a low porosity (col. 4, lines 45-51) in order to provide good adherence (col. 4, line 47-48). Levinstein only provides that the porosity is low and not an exact percentage such as 5%-10%. The claimed porosity would be readily determined through routine experimentation by one having ordinary skill in the art and would be obvious in Levinstein depending on the desired optimum porosity absence of showing new and unexpected results. See MPEP 2144.05. Therefore, one of ordinary skill in the art would have recognized that the plasma sprayed ceramic coating comprises a low porosity, which encompasses the claimed 5% to 10% as described above for the purpose of providing good adherence as taught by Levinstein (col. 4, lines 45-48).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a plasma

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sprayed ceramic coating comprising a low porosity, such as 5% to 10% in Chang et al in order to provide good adherence as taught by Levinstein.

13. Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al (USPN 6,120,640) in view of Akiyama et al (USPN 6,152,071) and in view of Levinstein et al (USPN 4,419,201).

Shih teaches a domed enclosure wall for a plasma processing chamber (Fig. 1) that comprises a dielectric material comprising a roughened surface having a roughness average of 100 to 300 microinches (col. 8-9, lines 54-4) and a plasma sprayed ceramic coating (col.7, lines 6-10 and 21) deposited on the roughened surface of the dielectric material, the plasma sprayed ceramic coating comprising a textured exposed surface having a roughness average of 100 to 300 microinches (Figs. 7-8 and col. 9, lines 23-26), whereby sputtered material generated by a plasma in a plasma processing chamber may adhere to the textured exposed surface. The dielectric material comprises a ceramic material, which comprises aluminum oxide or "anodized aluminum" (abstract and col. 6, lines 61).

Shih fails to explicitly teach coating the dielectric material with a ceramic composed of aluminum oxide or titanium

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oxide. However, Akiyama teaches that the surface of a plasma sprayed ceramic coating applied to a substrate is roughened in order to prevent peeling of the deposition film from the chamber wall (col. 14, lines 36-45). Akiyama also teaches that the plasma sprayed ceramic coating comprises aluminum oxide or titanium oxide in order to prevent peeling of the deposition film (col. 14, lines 24-32). Therefore, one of ordinary skill in the art would have recognized that a roughened plasma sprayed ceramic coating comprising aluminum oxide or titanium oxide is substituted for a plasma sprayed ceramic coating comprising boron carbide in order to prevent the peeling of the deposition film from the chamber wall as taught by Akiyama.

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Akiyama's roughened plasma sprayed ceramic coating comprising aluminum oxide or titanium oxide for Shih's plasma sprayed ceramic coating comprising boron carbide in order to prevent the peeling of the deposition film as taught by Akiyama.

Shih and Akiyama taken as a whole fail to explicitly teach that the plasma sprayed ceramic coating comprises a porosity of from about 5% to about 10%. However, Levinstein teaches that a plasma sprayed ceramic coating comprised of aluminum oxide (col. 4, lines 52-55), that is applied to a dielectric material

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comprising ceramics (col. 4, lines 42-45), used in a plasma processing chamber (col.4, lines 30-34) comprises a low porosity (col. 4, lines 45-51) in order to provide good adherence (col. 4, line 47-48). Levinstein only provides that the porosity is low and not an exact percentage such as 5%-10%. The claimed porosity would be readily determined through routine experimentation by one having ordinary skill in the art and would be obvious in Levinstein depending on the desired optimum porosity absence of showing new and unexpected results. See MPEP 2144.05. Therefore, one of ordinary skill in the art would have recognized that the plasma sprayed ceramic coating comprises a low porosity, which encompasses the claimed 5% to 10% as described above for the purpose of providing good adherence as taught by Levinstein (col. 4, lines 45-48).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a plasma sprayed ceramic coating comprising a low porosity, such as 5% to 10% in Shih and Akiyama combined in order to provide good adherence as taught by Levinstein.

ANSWERS TO APPLICANT'S ARGUMENTS

14. Applicant's arguments regarding the Double Patenting rejections over '045 have been noted and the rejections will be repeated until a terminal disclaimer is filed.

15. Applicant's arguments regarding the objection to the abstract has been considered but are moot since the objection has been withdrawn.

16. Applicant's arguments regarding the 35 U.S.C. 102 rejections of claims 9 and 11 as anticipated by Chang have been considered but they are moot since the rejections have been withdrawn.

17. Applicant's arguments regarding the 35 U.S.C. 103 rejections of claims 1, 2, and 4-8 over Chang have been fully considered but they are not persuasive.

In response to Applicant's argument that Chang fails to teach the recited value of the roughness of the structure having the plasma-sprayed ceramic coating deposited thereon, Chang teaches that the surface of the structure is roughened in order to promote keying or interlocking of the coating with the substrate (p.3, paragraph 26). One of ordinary skill in the art

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would have recognized that the amount of roughening performed on the structure prior to plasma-spray coating, is a result-effective variable, in that an optimal amount of roughening would be determined through routine experimentation to promote mechanical keying or interlocking of the coating with the substrate. Therefore, absent the showing of unexpected results it would have been obvious to one having ordinary skill in the art that the specific roughness value of Chang et al would be selected in order to balance the requirements of improving the keying or interlocking of the coating with the substrate and providing the coated surface with an overall roughness value between 150 and 190 microinches, as taught by Chang.

18. Applicant's arguments regarding the 35 U.S.C. 103 rejection of claim 3 over Chang in view of Levinstein have been fully considered but they are not persuasive.

In response to Applicant's argument that Chang fails to teach all of the limitations of claim 1, see the answer to the arguments regarding claim 1 above.

19. Applicant's arguments regarding the 35 U.S.C. 103 rejections of claims 1, 2, and 4-8 over Shih in view of Akiyama have been fully considered but they are not persuasive.

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In response to Applicant's argument that Shih fails to teach roughening a structure composed of aluminum oxide with a roughness average between 150 and 450 microinches, Shih teaches that the structure is formed of aluminum and anodized aluminum, which is aluminum oxide. Shih also teaches that the chamber wall prior to anodization is roughened to a roughness value between 100 and 300 microinches, and that the surface of the anodization is correspondingly roughened (col.9, 1.1-5). Therefore, it would have been obvious to one having ordinary skill in the art that the surface of the structure comprising aluminum oxide would have a roughness value between 100 and 300 microinches, since Shih teaches that the structure before anodization has a roughness value in that range and that after anodization it has a corresponding or similar roughness.

In response to Applicant's argument that Shih only teaches a suitable roughness value for bare aluminum before applying a coating and not a suitable roughness value for the anodized aluminum or aluminum oxide surface. Shih teaches that the aluminum is anodized after roughening and that the surface of the anodization is corresponding or similar to the roughness of the bare aluminum before anodization. Therefore, it would have been obvious to one having ordinary skill in the art that the since the surface roughness of the anodized aluminum is

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corresponding or similar to the roughness value of the bare aluminum it would obviously still fall in the range of 100 to 300 microinches.

In response to Applicant's argument that Akiyama fails to make up for the deficiencies of Shih, Shih suggests the recited average surface roughness value as shown above.

20. Applicant's arguments regarding the 35 U.S.C. 103 rejection of claim 3 over Shih in view of Akiyama and in further view of Levinstein have been fully considered but they are not persuasive.

In response to Applicant's argument that Shih and Akiyama fail to teach all of the limitations of claim 1, see the answer to the arguments regarding claim 1 above.

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this

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action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher P Bruenjes whose telephone number is 571-272-1489. The examiner can normally be reached on Monday thru Friday from 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christopher P Bruenjes
Examiner
Art Unit 1772
CPB
CPB
December 30, 2004

[Signature]
THOMAS H. BYON
SUPERVISOR/ART UNIT 1772
1772

1/6/05